



## *Addressing Barriers to Entry in Electric Energy Storage: A PPA Story*

*California PUC Electric Energy Storage Workshop*

*June 2011*

## Safe Harbor Disclosure



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AES Energy Storage is a division of AES Corp, a diversified global power company. Our business is to develop, own and operate grid-scale energy storage.



1,755 MW Wind  
Generation in the  
United States

37 MW Solar PV  
Generation in the  
Europe

### An industry leader in...

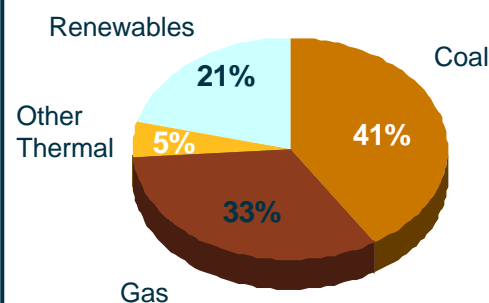
- Independent Power Production
- Project Finance
- Carbon Offsets
- International Privatizations
- Deregulation
- Solar PV

100 million people  
are served with  
AES electricity.

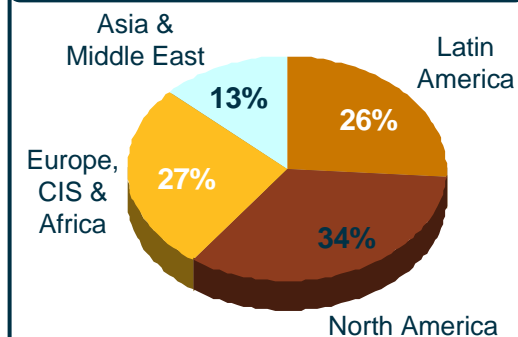
132 Power plants worldwide  
totaling approximately 40 GW  
gross generation capacity

14 Utilities worldwide,  
serving 11 million  
customers, with sales of  
77,000 GWh

### Fuel Type



### Geography



Note: As of October 2010

News Release Date: August 20, 2010



## **LIPA Issues Request for Proposals For New and/or Repowered Power Resources**

**LIPA is Seeking Up to 1000 MW to Modernize its Power Supply  
Resources to Reliably Serve its Increasing Customer Electricity  
Demands**

Uniondale, NY - The Long Island Power Authority (LIPA) released a Request for Proposals (RFP) today that seeks to purchase from experienced and qualified entities up to 1,000 megawatts (MW) of electric capacity, energy, and related services from new and/or repowered generation for a term of 20 years under power purchase agreement(s).

LIPA's 2010-2020 Electric Resource Plan released in February 2010 indicates that Long Island will need new resources in the 2016-2020 time-frame to meet electric reliability needs. To meet these needs and to modernize the power generation fleet under contract to LIPA, it is seeking up to 1,000 MW of Long Island-based power generation and/or off-Island power generation delivered by a new transmission cable, with such facilities to be in service as early as Spring of 2016.

May 18, 2011, 12:44 PM

# The New York Times

## Can Batteries Replace Power Generators?

By MATTHEW L. WALD



AES Energy Storage

A plant in Johnson City, N.Y., where batteries are used to store energy. AES Energy Storage proposes to furnish a bigger battery installation for the Long Island Power Authority.



**Business**

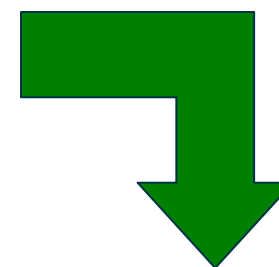
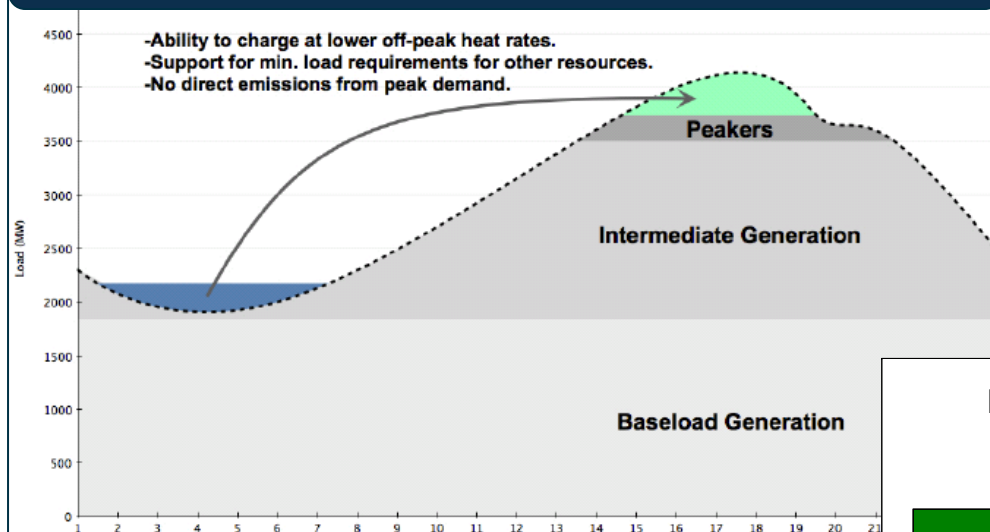
When the Long Island Power Authority said last summer that it was going to need new power capacity in the next few years, most people assumed that meant new generating stations or new transmission cables. But of the 16 companies that submitted proposals, one, AES Energy Storage, took an entirely different tack: it proposed batteries.

- ✓ Value
- ✓ Precedent
- ✓ Business Model
- ✓ Credentials

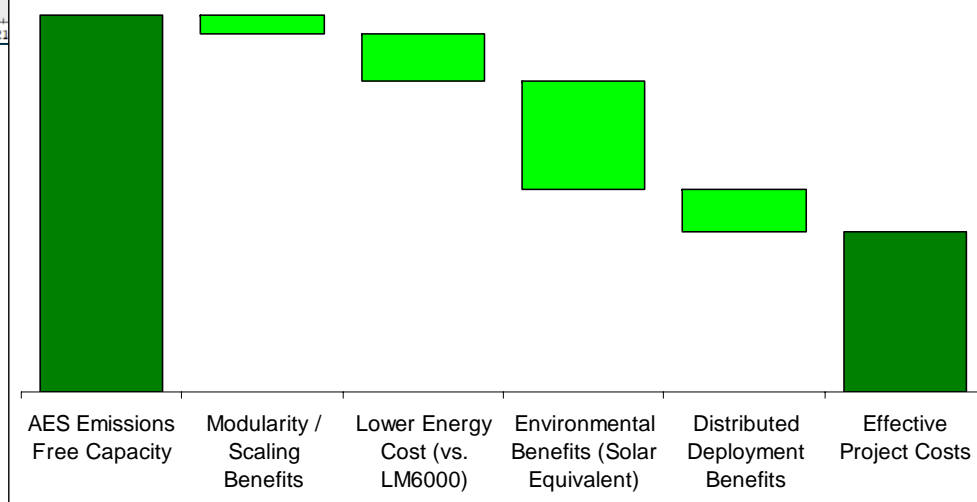
**Value: 400 MW/1600MWh Proposal for Long Island: A battery based peaking capacity solution is more economic than traditional technology.**



### Flexible Emissions-Free Capacity



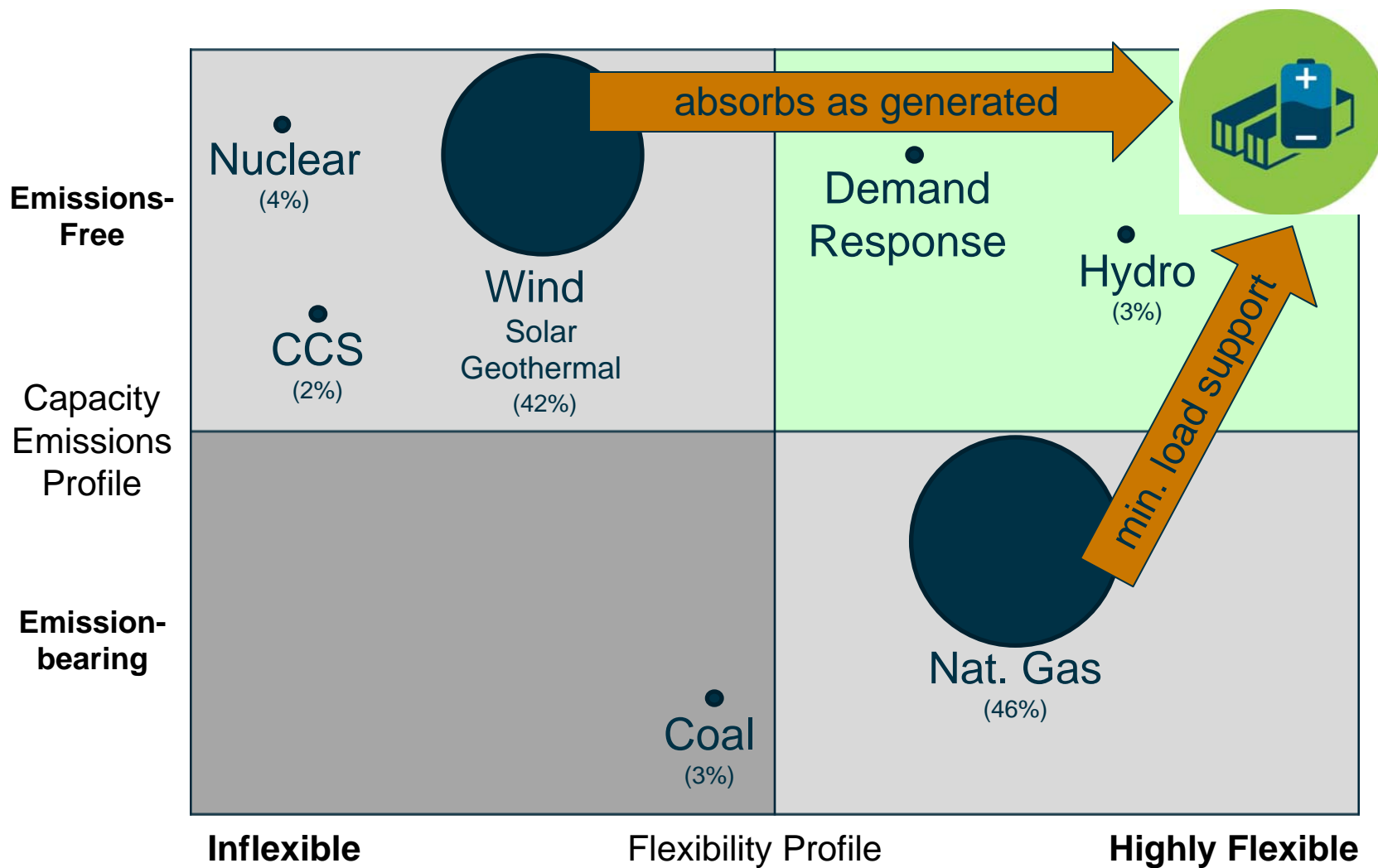
### Project Cost/Benefit vs. New LM6000



- ✓ Energy Storage can compete with traditional peaking capacity solutions.
- ✓ Several distinct and unique benefits create compelling solution.
- ✓ **Utilities and their regulators should anticipate the benefits of storage in their procurement processes.**



Value: Energy storage meets two pressing goals of electric power policy simultaneously: reduce emissions and ensure reliability.



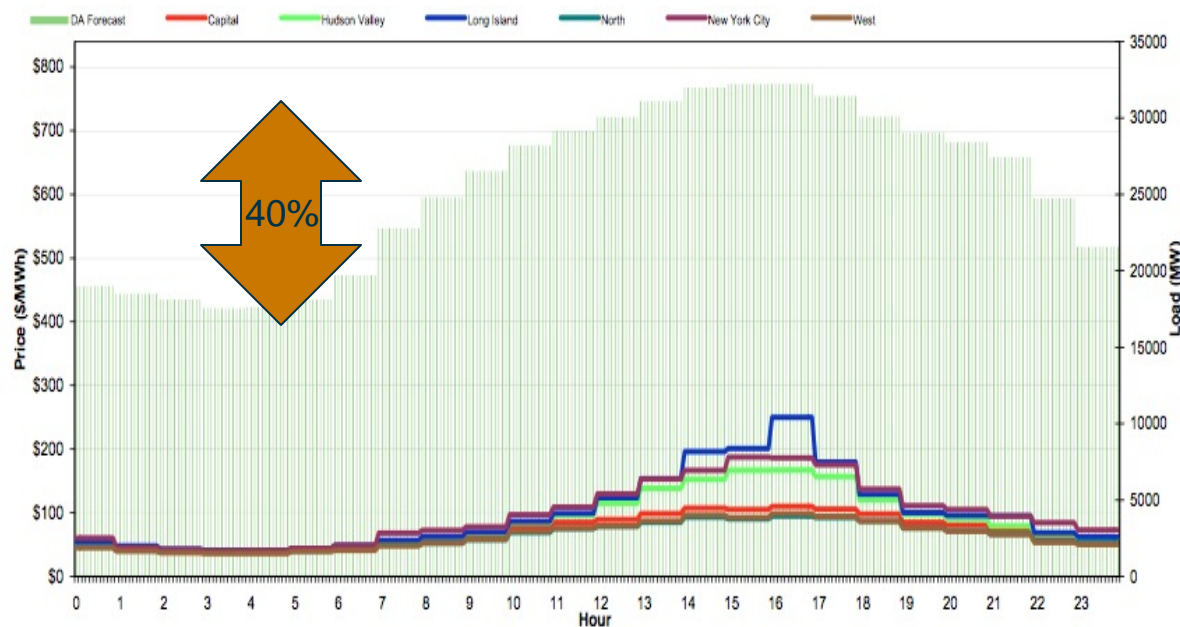
Size represents share of planned capacity additions in the U.S. 2010-2025, Source: EER

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Value: Peak to off-peak swing is 40% of total capacity in NYISO on peak days; average capacity factor of CCGT in U.S. is 43%.

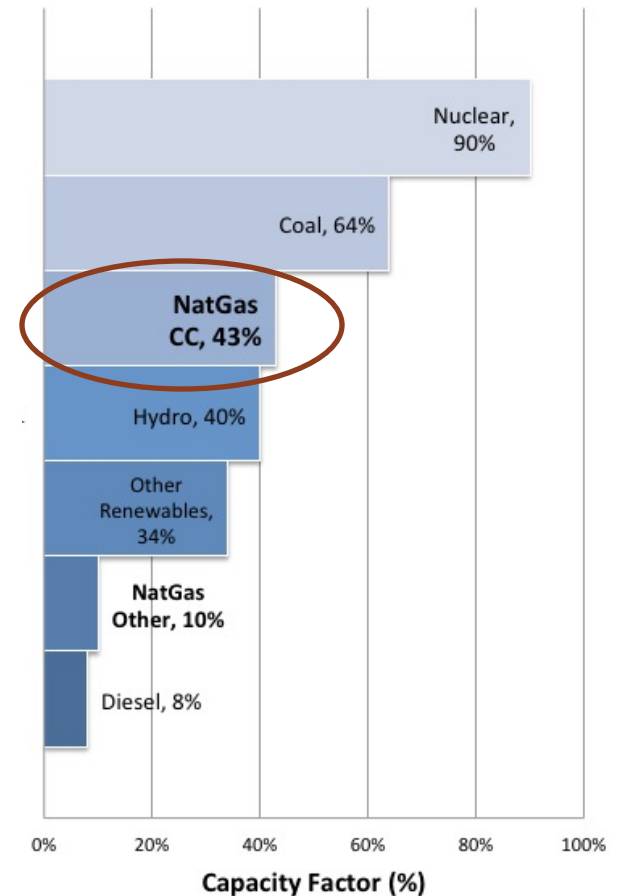


NYISO Load Curve, July 6<sup>th</sup>, 2010



Storage means we will use our growing CCGT fleet to its fullest.

Average Utilization, 2009  
Source: EIA





**Precedent: AES Energy Storage has 20 MW in operation serving two customer segments with another 64 MW in construction across 3 sites.**



Capacity Release for Generators



**12 MW**  
**Los Andes, Chile**  
*(in operation)*

COD: Dec-2009  
Size: 12 MW  
Revenue Model: 94 GWh energy sales/year  
Commercial Availability.: 100%

Reserve Capacity for Utilities and LSEs



**8/20 MW**  
**Johnson City, NY**  
*(in operation/construction)*

COD: Dec-2010/1H-2011  
Size: 8/20 MW (DOE LG)  
Revenue Model: Reg. Capacity Sales (NYISO)  
Commercial Availability.: >95%

**20 MW Angamos, Chile**  
*(in construction)*



Capacity Release for Generators

**98 MW Wind/32 MW Storage Project, WV-US**  
*(in construction)*

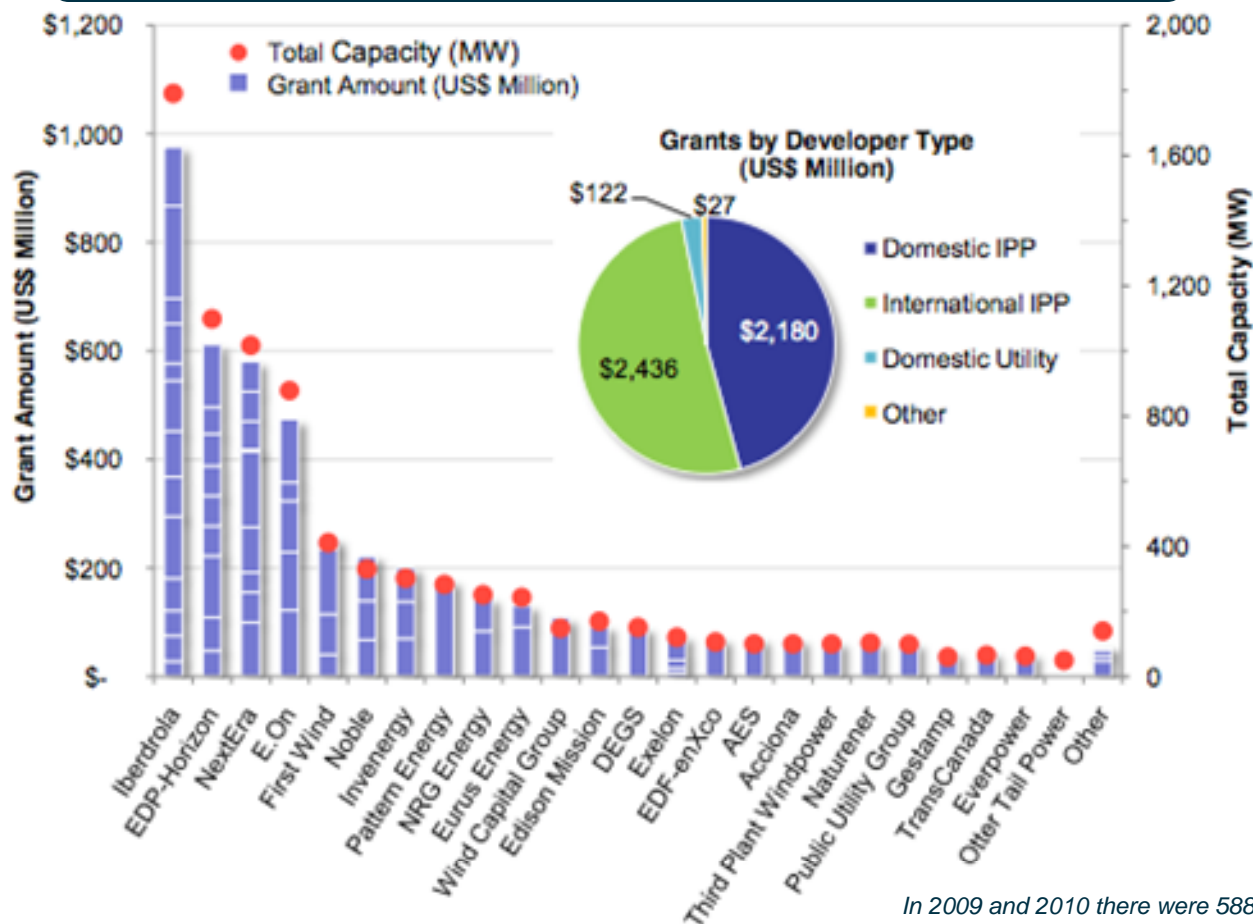


Reserve Capacity for Utilities and LSEs

**Business Model:** Similar to the wind industry, independent power producers (IPP's) are an appropriate point of entry for grid-scale storage.



Over the past two years, independent power producers (IPP) have provided 90% of wind capacity additions in the U.S.



Note: Each separation represents one project  
Source: US Treasury, IHS Emerging Energy Research

In 2009 and 2010 there were 588 MW of utility-owned projects brought online, but only 193 MW of these received the grant.

Opportunities to attract private capital to scale energy storage deployment rest in the hands of those who make and implement policy, including at the state/PUC level.

	Costs	Revenues
<b>Equity</b> Profits	i.e. Investment Tax Credit Leveling the playing field for storage vs other clean energy technologies. ➤ Congress	i.e. Pay For Performance Reward superior flexibility through market mechanisms ➤ FERC/ISO
	Technology Risk	Forward Sales
<b>Debt</b> Risk	i.e. Loan guarantees, CEDA Drive scale capital in advance of readiness by commercial capital markets ➤ DOE, Congress	PPAs Driven by “carrots” (i.e. PPA incentives) or “sticks” (i.e. clean capacity standards) ➤ PUC

By the way... history shows that the previous wave of inflexible resources (nuclear) had some flexible counterparts (pumped hydro) added in step with them.

